

CQ de WA2LQO

The official voice of the Grumman Amateur Radio Club
January 2012 Volume 85 Number 1

COMMUNICATIONS SYSTEMS (Continued from December 2011)

By Bob Wexelbaum, W2ILP

Some codes described in communications texts may not be of interest to most hams. Codes may be devised for other reasons beyond carrying text and digital messages. Examples are the codes that are used to control electro-mechanical devices or from parallel shaft encoders. These are codes where only one bit is changed at each count when sequentially counting up or down. If more than one bit was to change during the same increment an error might occur which would produce an incorrect code. Any code that satisfies the condition of changing only one bit per count is called a Gray Code. Such codes are credited to a man named Frank Gray. An example of a 4 bit Gray Code is:-

0 = 0000	6 = 0101	12 = 1010
1 = 0001	7 = 0100	13 = 1011
2 = 0011	8 = 1100	14 = 1001
3 = 0010	9 = 1101	15 = 1000
4 = 0110	10 = 1111	0 = 0000 (returning to 0 enables continuous rotation.)
5 = 0111	11 = 1110	

Gray Code is usually converted to a conventional binary code for further computer processing, where high speed narrow width sampling avoids counting errors.

The text books include Hamming Codes, which have nothing to do with Ham Radio hamming. They were named for an engineer named Richard Hamming, who devised them at Bell Labs in 1950. Hamming codes are *block codes*, so first we must define block codes in general. We consider that a message source can generate M equally likely messages. Then we initially represent each message by k binary digits, with $k^m = M$. These k bits are the information bearing bits. We next add, to each k bit message, r redundant (parity check bits). Thus each message is expanded into a code-word of length n bits with: $n = k + r$. This says that the total number of possible n bit code-words is 2^n , while the total number of possible messages is 2^k . There are therefore $2^n - 2^k$ possible n bit words which do NOT represent possible messages. Codes formed by taking a *block* of k information bits and “adding” r ($= n - k$) redundant bits to form a code-word are called *block codes* and designated (n,k) codes. When an n bit code-word consists of k information bits and r redundant bits it is called a *systematic code*. *Nonsystematic codes* which have n bits in the code-word and k information bits which are NOT explicitly presented in the code-word will not be discussed here. Suppose that a systematic code has four information bits which distinguish from one another the sixteen ($= 2^4$) possible messages, and that there are seven bits in each code-word so that each code-word has three redundant bits. If the code-word with n bits is to be transmitted in no more time that is required for the transmission of the k information bits and if T_b and T_c are the bit durations of the uncoded and coded word, then it is required that: $nT_c = kT_b$ and we can then define the rate of this code to be: $R_c = k/n$, which is an important ratio. It follows that: with $f_b = 1/T_b$ and $f_c = 1/T_c$, we have: $f_c/f_b = T_b/T_c = n/k = 1/R_c$. Now getting back to Hamming, we can define what is called the Hamming Distance, d_{min} . Consider that C_i and C_j are any two code-words in a particular block code. Then these code-words will differ in some bit positions and we represent the symbol d_{ij} the number of such positions with differences. Thus suppose $C_i = 1000111$

$C_j = 0001011$

Then we observe that these code-words differ in the least-most bit position and in the bit positions fourth and

fifth from the left. Thus $d_{ij} = 3$. Assume then that we can determine d_{ij} for each pair of code-words. Then the minimum value of the d_{ij} 's is called the *hamming distance*, d_{min} (Not to be confused with DX muf... hi hi). It becomes intuitive that when we try to determine which of two or more code-words a received "code-word" represents when some of the received code-words may be misread because of noise, the likelihood of a successful determination will be greater for words that have a larger number of bit differences. The greatest likelihood of confusion will be for a code-word pair for which d_{ij} is a minimum. Thus the Hamming Distance d_{ij} establishes an upper limit to the effectiveness of a code. There are two important properties of the parameter d_{min} :

- 1) Suppose that there are D errors in a received code-word. Then provided that $D < \text{or} = d_{min} - 1$ we shall be able to detect with certainty that the received code-word is not valid, i.e. not a word in our vocabulary.
- 2) If there are t errors in the received word then provided $2t + 1 < \text{or} = d_{min} < \text{or} = 2t + 2$ we shall not only be able to establish that the received word is not valid but also we shall be able to CORRECT the errors, i.e., we shall be able to regenerate the original correct code-word.

Thus with $d_{min} = 7$ we can detect a non-valid code-word even if as many as six errors have been made, and if no more than three errors have been made we can determine the correct code-word. The Hamming Codes work well in worst case conditions. In many cases even more errors can be detected and corrected than indicated by the example shown here.

The microprocessors which are the CPUs of most digital computers are fed Hexadecimal codes that are known as *machine language*. These are the *command codes* that tell the microprocessor when to perform arithmetic, sorting, accumulating, shifting, stacking, jumping and other logical operations. There are *compilers* that enable programmers to work at a higher level so that various sub routines may be accessed which sequence the required command steps to automatically perform specific operations without having to manually set up each machine language command. The initial code that is generated by computer keyboards and is used to provide digital information to computer color monitor displays is ASCII Code. It is basically an eight bit code where $2^8 = 256$ possibilities. More than one ASCII word may be used where more than 256 possibilities are required. 16, 32 or 64 bit extended words are now being used so that more information may be sent to 3D color displays and longer addresses may be utilized than would be limited by single 8 bit ASCII words. Now there is a universal serial bus (USB) code that works at high speed to connect computer accessories that formerly used slower code standards. (To be continued).

PRESIDENT'S NOTE by ED GELLENDER, WB2EAV

Every January we request payment of annual dues. The dues are still \$20. For multiple members in the same household, the group rate is \$25, and for retirees living out of town the rate is \$10.

For the last several years I have been operating on two meters with a HT that uses six AA-size cells. I usually put in NiMH rechargeables which show an open-circuit voltage of 1.45 Volts per cell right out of the charger, and soon drop to 1.35 Volts. They then hold that voltage until they are pretty much discharged at 1.2V. In 2008 I got a nice set of 2700 mAH cells and I use them all the time. The other day, the rig started acting like the batteries were dead, even when each cell was charged to 1.45 Volts. A saner person would have just bought new cells, but I got an idea. If open-circuit voltages aren't helpful, then check them under load...But how? I looked through the RadioShack website, found some parts I could get in the local store, and bought a small box, a single AA cell holder, two terminals (for the voltmeter leads), a switch and a package of five 10 Ohm ½ Watt resistors. Putting the resistors in parallel makes a nice 2 Ohm load. I quickly had it working. Put in each cell, read the voltage, press the button and see how much the voltage drops under load. Some only dropped by .05 Volts...Impressive. As for the beloved 2700 mAH units, they all dropped to one volt; I will miss them.

Editor's note: When cells are used in series, all should be the exactly the same type and age to reduce the probability of the internal resistance of any cell differing greatly from others, and thus eventually cause unequal cell life and loss of the ability of some of the cells to retain charge.

**GRUMMAN AMATEUR RADIO CLUB
MINUTES OF GENERAL MEETING 12/21/2011**

By Karen, W2ABK, Secretary

The meeting began at 5:30 PM by Ray, Jack, Dave, Andy, Bob and XYLs (earliest arrivals) at the Kwong Ming restaurant bar.

TREASURER'S REPORT – Ed, WB2EAV

Finances continue to be in good shape.

REPEATER REPORT – Gordon, KB2UB

Repeaters are working.

NET REPORT – Karen, W2ABK

Thursday night net at 8:15 PM on 146.745 MHz had two check ins.

Thursday night net at 8:30 PM on 145.330 MHz had a nice turn out.

Sunday morning net at 7:30 AM on 7.289 MHz was noisy.

VE REPORT – Bob, W2ILP

There were no applicants. Therefore the December VE session was cancelled.

OLD BUSINESS

Discussed HRU 2012, which would be at Briarcliffe College on January 8th. We planned to make information packets to distribute at the VE session.

NEW BUSINESS

The annual club dues are due.

PROGRAM

This was our annual holiday party at the Kwong Ming Chinese restaurant in Wantagh. Fourteen members attended. The food was reported to be the best Chinese cuisine that can be found on Long Island.

GARC NETS: 40 Meters: 7.289 MHz at 7:30 AM EST Sundays Net Controller: Eugene, W4JMX

Also see a message from Gene on Page 4.

2 Meter (repeaters) Net Controller, Karen, W2ABK **Thursdays: 146.745 MHz at 8:15 PM, 145.330 MHz at 8:30 PM; Both repeaters (-600 kHz) and 136.5 Hz tone.**

ARES/RACES NETS: Mondays.

MEETINGS: General Meetings of the GARC are held on the third Wednesday of each month, starting at 5:30 PM, at the Ellsworth Allen Park in Farmingdale. Driving directions and map can be obtained from <http://www.mapquest.com>. It is suggested that the GARC web site be checked to be certain of meeting location, which may change after this newsletter is distributed. Board meetings are held a week before the General Meeting at the Bethpage Skating Rink Center.

WEBSITE: The GARC web site can be found at <http://www.qsl.net/wa2lqo>. Webmaster is Pat Masterson, KE2LJ. Pictures of GARC activities, archives of newsletters, roster of members, and other information about the GARC may be found there

2012 MEMBERSHIP DUES ARE DUE

Dues are the same as last year: \$20 each, or \$25 for two members who reside at the same address. Retirees living out of town need pay only \$10. We are now offering an introductory \$10 rate to new members, which should be included with a membership application form. Checks should be mailed to: Grumman Amateur Radio Club, P.O. Box 0644, Bethpage, NY 11714-0644.

A MESSAGE FROM GENE, W4JMX

After 40 or so years of the WAG Net being on 40 Meters, it's time for a change. We have been trying to run the net on 7.289 MHz for the last two years with little success due to the European broadcasts sharing this portion of the band. With poor atmospheric conditions due to the low Cycle 24 results, it is my intention, as net controller, to move to 20 or 15 Meters as soon as the readers of "CQ de WA2LQO" receive this message. The new frequency for 20 Meters will be 14.289 MHz and the new frequency for 15 Meters will be 21.289 MHz

The Plan

Effective after I receive the January CQ de WA2LQO:

1-I will call the Early Bird WAG Net on 40 Meters (7.289 MHz) at 7:10 AM on Sunday.

If no satisfactory response, I will call the Early Bird WAG Net on 14.289 MHz (+ or – QRM); see step 2.

If satisfactory response, I will run the Early Bird and then the regular WAG Net on this frequency.

2-I will call the Early Bird WAG Net on 20 Meters (14.289 MHz) (+ or –QRM) at 7:20 AM on Sunday.

If no satisfactory response, I will call the Early Bird WAG Net on 21.289 MHz (+ or – QRM); see step 3.

If satisfactory response, I will run the Early Bird and then the regular WAG Net on this frequency.

3-I will call the Early Bird WAG Net on 15 Meters (21.289 MHz) (+ or – QRM).

If still no satisfactory response, the WAG Net will be abandoned for that week.

This procedure will be followed each week until some other scheme can be devised in order to continue the HF WAG Net in the future. Comments and alternate procedures are solicited.

73, Gene W4JMX

INTERNET LINK OF THE MONTH FOR INTERNERDS

This month I'll get serious about a useful Internet link that may be used to find the name and address of a person or business when you only have their land line telephone number. At the link I will give you this month, you can get that information free of charge. There are other sites where payment is required even for this basic information. At this site you will probably have to pay to get information about the user of a cell phone number or an unlisted number.. If you are willing to pay for it there is lots of information to be found on the web. Maybe more than we have a right to know. Try to Google or Yahoo up your own name, your ham call letters, your phone number or your street address, and you may be surprised what you may find. You can get the names and numbers of your immediate neighbors. You can find out who sold houses in your neighborhood, and what they cost. You might find out who died if you weren't paying attention. You can find critiques of medical doctors, lawyers and some other professionals. It may take some work on your part but the information is there on one server or another.. It is all part of "Freedom of Information."

Anyway the reverse phone number lookup website for this month is: <http://peoplesmart.com>

PUZZLE

This month I will give you another cryptogram to solve.

**JYF PYOGYJ VA RNAY NP FVHYPJB DHU ADNG UYDRNHX. NA BVM ODH ADZY JFDJ,
BVM'WY XVJ NJ IDUY.**

--XGVMOFV IDGQ--

The solution for the December 2011 cryptogram is:

AN AGE IS CALLED "DARK," NOT BECAUSE THE LIGHT FAILS TO SHINE BUT BECAUSE PEOPLE REFUSE TO SEE IT. --JAMES MICHENER—

GARC Officers

President: Ed Gellender, WB2EAV M/S:X08-14 516-575-0013 edward.gellender@ngc.com
or wb2eav@yahoo.com

Vice President: Gordon Sammis, KB2UB Retiree 631-666-7463

Secretary: Karen Cafalo, W2ABK 631-754-0974

Treasurer: Ed Gellender, WB2EAV (see above)

WA2LQO Trustee: Ray Schubnel, W2DKM Retiree

1 Yr. Board Member: Jack Cottrell, WA2PYK Retiree 516-249-0979

2 Yr. Board Member: Dave Ledo, AB2EF

2 Yr. Board Member: Jack Hayne, WB2BED

2 Yr. Board Member: George Sullivan, WB2IKT

Newsletter

CQ de WA2LQO is published monthly by the Grumman Amateur Radio Club for its members and friends.

Editor: W2ILP 631-499-2214 w2ilp.radio@gmail.com or w2ilp.radio@yahoo.com

Contributing writers: All GARC members (we hope). To submit articles or ham equipment advertisements contact the editor. Articles will only be edited when permission is granted by the author.

GARC Webmaster

Pat Masterson, KE2LJ Retiree 813-938-4614 Pat-Masterson@tampabay.rr.com

GARC VE Exams

We normally proctor exams for all classes of ham licenses on the second Tuesday of each month, starting at 5:00 PM. The exams are given at Briarcliffe College, 1055 Stewart Avenue, Bethpage, NY in room: Long Beach #5. Ham Exams are: Element 2 – Technician, Element 3 - General, Element 4 – Amateur Extra Class. All applicants must pre-register by contacting W2ILP. Time and location of exams are subject to change. If there are no applicants VE sessions will be cancelled. The fee for 2012 is \$14 for all exams taken at one sitting. New first time applicants should be aware that their Social Security Number will be required on the application form unless they register with the FCC for an FRN. Applicants for an upgrade should bring their present license and a photocopy of it. All applicants should bring picture ID such as a driver's license. Study material may be bought from the ARRL-VEC or W5YI-VEC <http://www.arrl.org> or <http://www.w5yi.org>. All VECs use the same Q & A pools.

Commercial FCC Radio Operator Exams

We are certified by the National Radio Examiners to administer exams for all classes of FCC commercial radio operator and maintainer exams. All Commercial Operator License Examiner Managers (COLEMS) use the same commercial license pools. Adminstrating fees vary. For information or to register contact W2ILP.

Editorial

Another year is gone, as are the Christmas and New Years Eve holidays. When I was a very little kid Christmas and New Years Eves were very mysterious times. That was because I was told about Santa Claus and about the midnight arrival of the New Year...but I wasn't old enough to stay up late to witness either of these events. Imagination is usually far better than reality. We tend to love mysteries that we can't actually get to see. That may be why a stripper with some clothes on is more mysterious than a nude. That may also be why the most beautiful woman in the world got recognized for spreading the spectrum and a Serbian magician got recognized for zapping artificial lightning bolts...while few people can name the quiet man who was the first to modulate continuous wave radio signals with voices. Imagination may be better than reality! That is why fiction must be stranger than truth to get people interested...and I admit that it now takes the joy out of the holidays that I enjoyed at the time when I was too young to investigate their reality. I dunno if you all will understand this but the trouble with ignorance may be that it is wasted on young people who can enjoy all the stuff that oldsters are no longer teased with....I think... w2ilp (Intelligence Limits Phoniness)...but it also limits joyful expectations.....

Sixty Eight Years 1944-2012
P.O. Box 0644
Bethpage, NY 11714-0644

FIRST CLASS MAIL

HEDY LAMARR 'S OTHER "INVENTION" by W2ILP

Last month I discussed Hedy Lamarr's alleged invention of Spread Spectrum, for which she collaborated with George Antheil. Hedy was alleged to have invented more than Spread Spectrum and this led me to research exactly what other invention "the most beautiful woman in the world" might have tried to invent.

When Hedy was a teenager, growing up in Vienna, Austria, her father, Emil Kiesler, who was a banker, often held parties where he invited German industrialists and military experts. At one time he even entertained Benito Mussolini, who had specifically asked to be seated next to Hedy! Often among Hedy's dad's guests was Fritz Mandl (no "e"), who was a munitions manufacturer. Mandl later became Hedy's first husband. Hedy was there to look pretty...but she paid attention to what was being discussed, because she was curious and interested in science. The subject of the development of submarines was an interesting topic. Submarines were limited to using electric motors and rechargeable storage batteries while submerged because diesel engines require air or oxygen in order to make fuel combustible. As a result they could only go at a limited speed when submerged. Some U-boats were built to use fuel mixed with hydrogen peroxide to develop its own oxygen when ignited, and thus enabled high underwater speeds. However, the exhaust backpressure caused such poor fuel economy that they were not militarily significant.

Years later, after Hedy had become famous as a movie star in the U.S., she was trying to think of something to invent that had not yet been invented. In the U.S. there were lots of products coming on the market that were dehydrated and were made ready to eat or drink by just adding hot or cold water. Some of these products were developed to feed U.S. troops and our allies during WWII. Others were made so that there would be less work for busy housewives. There was dehydrated coffee, tea, soup, milk, eggs, etc. And there was a dehydrated drink known as Kool-Aid, which used similar artificial or natural flavors and colors as the popular desert called Jell-O. Hedy's brain storm was to use a bouillon like cube, added to cold water that would make a sparkling drink that would be like Coca-Cola or cherry soda. She remembered how the U-Boat designers had added hydrogen peroxide to provide oxygen to fuel. Why not add baking soda and powder to Kool-Aid so as to provide the CO2 bubbles, as is done in some cake mixtures? For this project, she would need the help of two expert chemists. Hedy sought funds from a man of wealth who could provide money for developing her soda cubes. She got money to fund this project from none other than Howard Hughes! We may not understand why he gave money to Hedy... but he did. Howard at that time was beginning to have mental problems, including a fetish about not touching people because he believed that they all carried harmful germs. According to her autobiography, "Ecstasy and Me", he asked Hedy to make a rubber casting of her body for him to sleep with. She then asked Hughes why he only wanted a casting of her body when she was willing to offer him the real thing. Hughes replied, "Because you are too good for me."

At any rate the sparkling soda cube was a failure. It was impossible to prevent the resulting drink from tasting like Alka-Seltzer, which tastes as bad as a solution of pure sodium bicarbonate. Oh ..What a fizz it was! -w2ilp-